LAW OFFICES
GOLDBERG, GODLES, WIENER & WRIGHT
1229 NINETEENTH STREET, N.W.
WASHINGTON, D.C. 20036

HENRY GOLDBERG
JOSEPH A. GODLES
JONATHAN L. WIENER
HENRIETTA WRIGHT
MARY J. DENT
DANIEL S. GOLDBERG
W. KENNETH FERREE

THOMAS G. GHERARDI, P.C.
COUNSEL

(202) 429-4900
TELECOPIER:
(202) 429-4912

October 15, 1996

EX PARTE

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: MM Docket No. 87-268

Dear Mr. Caton:

This letter reports that representatives of the Coalition of Film Makers[1] met with Commissioner Susan Ness and Anita Wallgren, on Friday, October 11, 1996, to demonstrate and discuss aspect ratio standards and progressive scanning technologies for the display of films via digital television. In addition, Commissioner Ness and Ms. Wallgren were given copies of the attached materials. The Coalition's presentation is otherwise reflected in written submissions that already are part of the record in this docket.

The meeting referenced herein took place in Los Angeles, California. Time zone differences precluded the filing of this letter on the day of the meetings. If there are any questions, please contact the undersigned.

Sincerely,

W. Kenneth Ferree

cc: Commissioner Susan Ness
Anita Wallgren, Esq.
William E. Kennard, Esq.

[1] The Coalition is comprised of the Directors Guild of America, the American Society of Cinematographers, the International Photographers Guild, Local 600, IATSE, AFL-CIO, and Panavision International L.P.

Robert Primes ASC, director of photography

(213) 851-8444
fax: (213) 851-4493
mobile: (213) 598-4377
e-mail: Primes ASC @aol.com
2062 Watsonia Terrace, Hollywood, CA 90068-3217

October 11, 1996

Notes for FCC Commissioner Susan Ness

!. Without the complex characters and life situations of *literature*, Americans have no way of learning the complex thought process necessary to vote intelligently and participate in the democratic process. If one is only exposed to stories about simplistic heroes and villains, life is expected to be uncomplicated and easy to understand. It becomes easy to believe in a catchy slogan rather than to think things out.

2. Americans get far more of their literary input from television than from books, theatre or projected motion pictures.

3. In order for the public to concentrate on and fully understand complex or deep literature presented via television, the work must be presented with maximum impact. This means that to be effective it should be well paced, well written, well acted and that the ***full visual power of the medium be employed for maximum emotional impact!*** This is because the most profound works in filmed literature rely on the visual language of cinema to achieve their effect.

4. While projected motion pictures have tremendous visual impact, our current NTSC television system has had very little, emitting only 1/100 to 1/1000 as much visual information as a projected film[1].

5. *It is therefore in the best interests of the public, that the next generation of American television approach the visual quality of a projected motion picture!*

6. The ACATS proposal has failed to do this for a number of reasons.

A) There is no provision that the whole picture area be shown. Because of the extremely low definition of the NTSC system, broadcasters, against our objections, routinely cropped off the sides of movies to fill the screen. There is no longer any reason to do this with the wider, sharper HDTV format *yet this very week "Twister" was shown on 16x9 DVD **cropped** from its original widescreen format to fit 16x9!* **It is not sufficient to merely hope that broadcasters will be intelligent enough to show the entire picture, it must be *part of the***

[1] See my filing with the FCC on this matter.

specifications **of the new systems that programs to broadcast and displayed in the original aspect ratio in which their authors created them.** ***This is the single most important concern of the artists who make motion pictures and television programs.***

B) There is no guaranteed provision that Progressive Scan will become the American standard. The superiority of progressive scan images has been acknowledged by members of ACATS and ATSC, the computer industry, etc. so much that it is no longer disputed that it should be or become the new standard. Unfortunately, Sony builds approximately 70% of the equipment in most television studios[2] and Sony has already developed 1125 line HDTV ***interlaced*** studio equipment. So even though the ACATS proposal allows 14 different progressive scan formats and insists broadcasters will, to save bandwidth, *probably* undo the 3/2 pulldown of film transferred to interlaced tape and broadcast films at 24 frames per second progressive, **there is no guarantee whatsoever in the ACATS proposal that broadcasters won't simply buy the interlaced Sony gear and create an interlaced studio and an interlaced standard.**

When Stan Baron was asked[3] why the 1920x1080 60hz. interlaced format was included, he said that for fast moving sports, like the Olympics, it offered better quality than progressive scan. It was only when it was pointed out to Mr. Baron that the vertical resolution of interlace is 40% worse than progressive and the horizontal resolution of moving objects in interlace is only half as good as progressive that he admitted that any gain would only be in the horizontal resolution of non-moving objects[4]. **I believe the inclusion of interlace has nothing to do with sports and everything to do with the ready availability of foreign made HDTV interlace equipment. Wouldn't it be better to start off with an all-progressive system. It would.**

a) Allow American industry to design and build progressive equipment knowing there was a guaranteed American market for it.

b) Save American broadcasters and the American public from investing in outdated interlaced technology now only to have it become obsolete and have to reinvest in progressive scan equipment. Once we invested in NTSC we could never progress until now. Let's do it right the first time.

c) Insure compatibility with the information highway and the convergence of TVs and computers.

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[2] Per Branko Gerovac of MIT

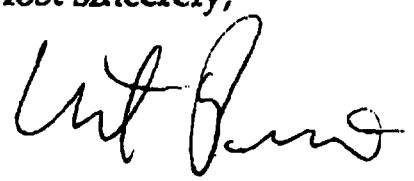
[3] American Society of Cinematographers meeting on 10/7/96

[4] [illegible]

d) Insure the superior visual quality of progressive scan movies and programs reaches the viewer.

I believe these thoughts are representative of the concerns of cinematographers and directors and sincerely hope you will give them due consideration. It is our hope that we can amend ACATS to include these relatively simple changes to an **all progressive system showing the complete original composition** and get on to implementing the system.

Most sincerely,



Robert Primes, ASC

September 20, 1996

There has been a great deal of controversy surrounding the development of a new television standard to replace NTSC, particularly on the issues of aspect ratio and interlaced versus progressive scanning. I am a member of SMPTE, I work in engineering management at a studio, and I've spent much time talking and exchanging email with a few ASC members, particularly Robert Primes. I hope it may be possible to offer some helpful clarifications based on my understanding of their position, and on my own experience.

Aspect Ratio:

There is an underlying assumption in the aspect ratio controversy that we really need to confine advanced television to just one ratio, and that it should be written into the standard. Standards ought not to contain anything which isn't absolutely necessary.

When our existing television systems were created, it was reasonable to predict that the Cathode Ray Tube would be the dominant display device for the duration of their use. Appropriately, all existing systems transmit CRT specifics, such as sync pulses and retrace blanking intervals, as part of the standardized signal. It was, therefore, reasonable that such systems be constrained to a single aspect ratio.

Though technology is changing more rapidly than ever before, we can still make useful predictions about what is likely to remain constant throughout the next generation of television. The important things that are sure to be in all TV sets farthest into the future are memory and processing power. Ordinary TV sets will have enough memory to hold several frames, because the decompression process needs to work on several frames at a time.

In a digital data stream, and in memory, there is no reason to be constrained to just one aspect ratio. Each show can have its horizontal and vertical pixel counts given in its headers. Given mass production, inexpensive silicon doing simple arithmetic could scale any data to fit in any given display. Letterbox bars could be created automatically in the TV set, instead of being sent as if they were picture data.

In feature film production, the creative community has long enjoyed the choice of aspect ratio. Any projectionist can show you the collection of mattes and lenses that makes that possible. It is incredible that anyone would seriously propose a digital high definition video standard that cannot match the aspect ratio versatility of the century old mechanical technology of film.

When a show made in one aspect ratio has to be transferred to a system having a different aspect ratio, some sort of compromise has to be made. There are several possibilities.

One method is to truncate or discard part of the image, thereby altering the composition. There are two variations on this. If a show was shot without any anticipation of such a change of aspect ratio, the extraction area has to be chosen and moved on a shot by shot basis. This is commonly called "pan and scan". If it is known before production that two aspect ratios must be supported, the cinematographer is asked to work with both frames marked on the ground glass, composing for the smaller one, and keeping the larger one free of any equipment and crew people. This is called "shoot and protect".

Another method which I have seen demonstrated, but which has no significant support, is to distort the image to fit, as an old fashioned fun-house mirror would.

Finally, it is possible to present the entire original composition within the new frame, leaving blank space at the top and bottom if the new frame is narrower, or blank space at the sides if it's wider. This is called "letterbox".

There are problems with each of the ways of dealing with multiple aspect ratios. Therefore, the big problem is to decide which problems to live with. There are no strong technical arguments in favor of any one of the three. Under those circumstances, it would be appropriate to let expert aesthetic judgement make the decision. That's what the ASC offers us.

The ASC takes a strong position in favor of the " "letterbox" method over all others. Years of experience with letterbox and both the "pan and scan" and "shoot and protect" variants of truncation have led them to their conclusion. The ASC would like to see that written into the standard for advanced television. Unfortunately, it's difficult to come up with a technical necessity for putting such a requirement into the standard.

By using less than the whole display area, letterbox trades away some resolution to preserve composition. It's a more affordable tradeoff in high definition than in NTSC or PAL. Resolution has always been a variable under the cinematographers' control. They routinely use diffusion to hide fine lines on faces in close-ups, and remove it for wide shots.

Many years ago, I saw an old Rudee Vallee soundie that was made in an aspect ratio that resulted from cutting out that newfangled sound track area. I remember being told that it was 1.18:1. I've also seen the 16:9 version of a sitcom that was made in the "shoot and protect" truncation method, with all the action confined to a 4:3 area centered within 16:9. They have a remarkable similarity. Both are very obviously impaired transitional products, the sort of things that we don't want in our archives, because they'll be tough to sell in the future.

When four or five people are composed in a group in the "shoot and protect" mode, the "protected" area on the sides is dead space, very unnatural. When it's always there, shot after shot after shot, the sitcom gets a sort of "Twilight Zone" quality. The editorial timing of entrances and exits is also thrown off, which adds to the feeling that we're seeing things that shouldn't be there. Of course, that's exactly what's happening.

In the earliest sound movies, people talked to potted plants that were used to conceal the microphone. In "shoot and protect", though the 4:3 composition may be reasonable, the 16:9 version is sometimes filled out with unnecessary potted plants. We should avoid making shows in a way that will very soon look very silly.

2:1 vs. 16:9:

The transmission standard ought not to specify an aspect ratio. TV sets, however, are solid objects with fixed dimensions, so each set will have a fixed ratio for the largest picture it can display. Today's TV sets don't all have the same dimensions, and in the future, they shouldn't all have to have the same largest image aspect ratio.

The 16:9 aspect ratio is one of HDTV's first compromises, carved in stone over ten years ago. It is clear that a manufacturing capacity exists for 16:9 CRT's, and that they will be the dominant display in the very earliest years of this new generation of television.

However, we must think of the whole life cycle of any new television system. The investment in monochrome NTSC in 1952 was proportionally far greater than the present investment in 16:9. There are no commercial 16:9 stations on the air, and no such receivers in American homes. It would be an unnecessary shame to create an impediment to the manufacture of sets in other aspect ratios by writing a ratio into the standard. Manufacturers should be free to move to other ratios as soon as technology and the market allow. The ASC's suggestion to them is 2:1.

The ASC is aware that the 2:1 aspect ratio would create an area and resolution bias in favor of wider aspect ratios and against narrower ones, while 16:9 yields a more even distribution of impairment. There are two very good aesthetic reasons to want such a bias.

Some shows are shot to be seen small, some large. The majority of the 1.33:1 material that exists was made for NTSC television. It's intended to be seen on a small screen. All existing wide material was intended to be seen on large theater screens. Cinematographers, directors, and editors make different decisions for screens of different sizes. I've seen close-ups that are powerful on TV, but laughable on a big theater screen.

Wider formats, 70 mm and anamorphic 35 mm, are inherently of higher resolution than the narrower ones, especially video. Aesthetic decisions made in shooting were, and are, made in light of the resolution of the originating medium. Therefore, a truer preservation of original intent can be had by biasing in favor of wider ratios.

In conclusion, this whole controversy is the result of a failure on our part as engineers to distinguish between aesthetic decisions and technical ones. Aspect ratio properly belongs to the artists. When we forget that, we step on the toes of the creative community. We should thank them for not being shy about letting us know it.

Interlace vs. Progressive Scanning:

In progressive mode, each frame is scanned line by line from top to bottom, complete in one pass. In interlace, each frame consists of two fields. In the first field, the odd numbered lines are scanned from top to bottom. Then in the second field, the even numbered lines are placed between them.

As a result, high contrast horizontal lines appear in different places in the two fields. That makes them appear to flicker or jitter vertically. Strong patterns in clothing, the edges of venetian blind blades, distant buildings, and many other common subjects trigger this artifact. The flicker can be reduced by filtering or anti-aliasing, which reduces resolution. They're all essentially just fancy names for softening focus.

Interlace cuts the amount of information that must be transmitted in half, and very nearly cuts the resolution in half, so some slight resolution advantage could be claimed for it, at the cost of some residual flicker. Its most significant advantage was that it could be done using the analog vacuum tube technology they had when NTSC was created, in 1952. Today, we can achieve much greater data reduction digitally, with almost no image degradation. Digital compression works more efficiently on progressive material than on interlace, negating any residual advantage that interlace might have had.

The main reason interlace was the right choice for NTSC is that they could only make about 250 active lines in the progressive mode back then. In a 250 line picture, you see the lines. But in a 484 line picture, which is what we have with NTSC, they're much less obtrusive.

The real nightmare is the interlaced video camera. The problem is that things move between the time one field is captured and the next. Therefore you can't get a complete picture just by putting two fields together. De-interlacing is difficult, expensive, imperfect, and it can't eliminate the softening of focus required to reduce flicker. Unlike a film originated show, there isn't anything better to fall back on.

As budgets get tighter, there will be pressure to move film shows to HDTV origination. Old interlaced 1125/60 cameras are readily available, and could be rushed into use. One of the Grand Alliance interlaced combinations is clearly a back door for dumping this obsolete equipment in the U.S. market. That could result in the worst of the eighteen ATSC combinations gaining market dominance.

In any case, you have a more or less severely impaired image when you try to sell into the progressive scan markets of the future. All computer related applications, both networked (internet) and disk based (DVD), are inherently progressive. They're not regulated by the FCC, and can introduce improved resolutions whenever the market is ready for them. Foreign markets may well adopt their own progressive systems. They are extremely unlikely to adopt the Grand Alliance/ATSC.

If the United States is to retain respect as a high technology superpower, we must avoid the international embarrassment of adopting such a backward television standard.

Respectfully,

John L. Sprung